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(54) DYE THERMAL TRANSFER ACCEPTIVE SHEET

(57)Abstract:

PROBLEM TO BE SOLVED: To prevent the generation of floating of a seal by release of an acceptive sheet section and a separator section of a half-cut section of the acceptive sheet of a label type following the lapse of time after printing.

SOLUTION: The dye thermal transfer acceptive sheet is provided with the acceptive sheet section having an image acceptive layer on one face of a sheet base and an adhesive mass layer on the other face and a separator section having a release sheet base and a release layer formed on one face of the release sheet base, on which the adhesive mass layer of the acceptive sheet section and the release layer of the separator section are so laminated as to face each other, and the dye thermal transfer acceptive sheet is characterized by the 180° release force of the acceptive sheet section and the separator section of 390 mN/25 mm or more and the creep amount of 35  $\mu$ m or less after overlapping the acceptive sheet section with the separator section and applying the shear force of 60 gf load for 40 minutes.

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 CLAIMS
 

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[Claim(s)]

[Claim 1] with the acceptance sheet section which, on the other hand, looks a color image acceptance layer like [ one side of a sheet base material ], and has a binder layer In the color hot printing acceptance sheet by which the laminating was carried out so that it might have the separator section which has a base material for exfoliation sheets, and the stratum disjunctum formed on the whole surface and the binder layer of said acceptance sheet section and the stratum disjunctum of said separator section might counter The color hot printing acceptance sheet characterized by the creep after the 180-degree exfoliation force of the acceptance sheet section and the separator section is 390mN(s) / 25mm or more, and it applied the acceptance sheet section and the separator section by superposition and it applies shearing force by the load of 60gf(s) for 40 minutes being 35 micrometers or less.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a color hot printing acceptance sheet. Furthermore, the laminating of the exfoliation of the acceptance sheet section is made possible to the separator section in detail, and it is related with the color hot printing acceptance sheet (only henceforth an acceptance sheet) which exfoliates from the separator section and can stick an acceptance sheet part on various things after an image imprint.

[0002]

[Description of the Prior Art] In recent years, the thermal printer and the color thermal transfer printer which can print a clear full color image especially have attracted attention. With the heat to which the acceptance layer which contains the color dyeing property resin of an acceptance sheet in a color ink sheet is supplied from superposition, a thermal head, etc., only predetermined concentration imprints the color of the necessary part of a color layer on an acceptance layer, and a color thermal transfer printer forms an image. An ink sheet consists of a color of yellow, a Magenta and three colors of cyanogen, or four colors that added black to this. A full color image is obtained by repeating the color of each color of an ink sheet in order on an acceptance sheet, and imprinting it on it. By the latest printer, processing may be further made after image formation for the improvement in image shelf life. They are the case where a transparent lamination layer is formed on an acceptance layer, applying heat by a thermal head etc., the case where only heat is applied to an image, etc.

[0003] There is an acceptance sheet of the label type which can stick the sheet after the acquired imprint record on various goods freely in such an acceptance sheet. A label type acceptance sheet is the configuration which carried out the laminating of stratum disjunctum, a binder layer, a sheet base material, and the color image acceptance layer on the base material for exfoliation sheets. It can exfoliate between the separator section which consists of the above-mentioned base material/stratum disjunctum for exfoliation sheets, and the acceptance sheet section which consists of the above-mentioned binder layer / sheet base material / color image acceptance layer, and the acceptance sheet section can be stuck on various goods. The quality for which a label type acceptance sheet is asked has high image concentration, and is good imprint record without generating of the curl by the heat at the time of an imprint being performed, and being able to exfoliate mutually the acceptance sheet section by which image formation's was carried out, and the exfoliation sheet section easily and correctly after transfer picture record moreover.

[0004]

[Problem(s) to be Solved by the Invention] There are some label type acceptance sheets which could exfoliate between the separator section and the acceptance sheet section, and performed half cutting processing to the acceptance sheet section. After the print, with time amount progress, the acceptance sheet section of the half cutting section and the separator section peeled, the seal float was generated, and it had become a problem with the acceptance sheet of the label type which carried out half cutting processing.

[0005]

[Means for Solving the Problem] It is considered to be the cause that the acceptance sheet section contracts with the heat which starts at the time of a print, and this is generated when the exfoliation force is weak. Although a seal float is solvable with the cure which raises the exfoliation force using a soft binder, curl before a print newly becomes a flat, poor transit occurs or problems, like the curl after a print becomes large occur. It is because it is necessary to attach the curl on the structure and before a print to the top and the back about 5mm depending on a printer. In a soft binder, even if it controls curl in the top and the back at the time of a tuck, curl will become a flat by gap of an adhesive layer during sheet (sheet) preservation. By specifying the creep by the exfoliation force and shearing force of a binder, a problem is solved and this invention person etc. came to complete this invention, as a result of inquiring wholeheartedly that the

above-mentioned technical problem should be solved.

[0006] this invention with the acceptance sheet section which, on the other hand, looks a color image acceptance layer like [ one side of a sheet base material ], and has a binder layer In the color hot printing acceptance sheet by which the laminating was carried out so that it might have the separator section which has a base material for exfoliation sheets, and the stratum disjunctum formed on the whole surface and the binder layer of said acceptance sheet section and the stratum disjunctum of said separator section might counter It is the color hot printing acceptance sheet characterized by the creep after the 180-degree exfoliation force of the acceptance sheet section and the separator section is 390mN(s) / 25mm or more, and it applied the acceptance sheet section and the separator section by superposition and it applies shearing force by the load of 60gf(s) for 40 minutes being 35 micrometers or less.

[0007].

[Embodiment of the Invention] When a binder layer satisfies the above-mentioned conditions, the label type color hot printing acceptance sheet of this invention has good curl after performance traverse and a print, and does not carry out an after [ a print ] seal float.

[0008] The measuring method of the 180-degree exfoliation force is JIS. Z It is an approach according to 0237. The differences with JIS are the sticking-by-pressure approach and a test panel. In this invention, since the exfoliation force of the acceptance sheet section and the separate section is measured, the sticking-by-pressure approach is sticking by pressure by the usual tuck machine, and a test panel becomes the separate section. Namely, what is necessary is to make a label type color hot printing acceptance sheet into a width of 25mm, and just to measure the exfoliation force as it is. In addition, it is good for measurement of the exfoliation force to use a well-known exfoliation force measuring device. Although exfoliation force is satisfactory to a seal float if it is 390mN / 25mm or more, 800mN / 25mm or less are desirable. If it exceeds 800mN(s) / 25mm, the exfoliation after a print will become heavy and it will be hard coming to strip in the case of attachment.

[0009] The measuring method of the creep by shearing force is the value which calculated the creep ( drawing 2 ) when setting as shown in the test piece of drawing 1 , and applying the load of  $F=60\text{gf}$  for 40 minutes by die-length mum. That is, it is good to calculate the creep after making the acceptance sheet section and the separator section into the shape of a strip of paper of 5mm width, applying 10mm by superposition (area 50mm<sup>2</sup> of superposition) from the one end section and applying shearing force by the load of 60gf(s) for 40 minutes. It is the description of this invention that this creep is 35 micrometers or less. Incidentally, if it exceeds 35 micrometers, the curl after a print cannot be suppressed.

[0010] In order to make the exfoliation force and creep into the specific range 180 degrees, it can attain by combining suitably the component of a binder layer, the configuration of stratum disjunctum, the base material to be used.

[0011] As a binder which constitutes a binder layer, well-known binders, such as acrylic, a synthetic-rubber system, a natural rubber system, and a silicone system, can be used. Moreover, to a binder, a cross linking agent and an additive can be added if needed. As a cross linking agent, cross linking agents, such as an isocyanate system, an epoxy system, and a metal chelate system, can be used. As an additive, tackifiers, such as a petroleum system and a rosin system, etc. can be used. The class and combination number of copies of a binder, a cross linking agent, and an additive can adjust in adjustment of the exfoliation force and a creep. In addition, although it cannot generally crawl on it since the addition of a cross linking agent and a tackifier is based on combination, they are 0 - 5%, and 0 - 30% (solid ratio) extent to a binder, respectively. Molecular weight of a binder is to some extent large, and it is desirable that the distance between functional groups which is a point constructing a bridge has comparatively short structure. It is better for a cross linking agent to press down an addition if possible using what has comparatively small molecular weight.

[0012] a binder layer -- coating machines, such as a bar coating machine, a gravure coating machine, a comma coating machine, a blade coating machine, an air knife coater, and a die coating machine, -- using -- a conventional method -- following -- the coating liquid for acceptance stratification -- coating -- it can dry and form. The amount of coating of a binder layer has two or less (solid content) desirable 10 - 30 g/m. In less than two 10 g/m, when the adhesion effectiveness is scarce and exceeds 30 g/m<sup>2</sup>, there is a possibility of producing the flash from the perimeter of about [ being scarce ] and a binder from the field of economical efficiency in need. after carrying out coating to the stratum disjunctum front face of the separator section and drying on it, lamination of the binder may be carried out to the rear face of the sheet base material which has an acceptance layer on a front face, on the other hand, the sheet base material which has an acceptance layer boils it, and it may stick a binder so that the stratum disjunctum of the separate section may touch this after coating desiccation.

[0013] The stratum disjunctum used for this invention can use a well-known remover, if the exfoliation force and creep of the above-mentioned specification are satisfied. Although based also especially on combination with a binder layer, generally a heavy exfoliation type remover is desirable, and heavy exfoliation type silicone resin is especially desirable.

A gravure coating machine, a bar coating machine, etc. can perform the coating approach to the base material for exfoliation sheets of stratum disjunctum. the amount of coating in this case -- solid content -- 0.3 - 1.5 g/m<sup>2</sup> -- 0.5 - 1.2 g/m<sup>2</sup> is suitable preferably. In less than two 0.3 g/m, when the variation in detachability ability is large and exceeds 1.5 g/m<sup>2</sup>, it is scarce from the field of economical efficiency to practicality.

[0014] As a sheet base material of the color hot printing acceptance sheet section used for this invention, although based also on combination with the base material for exfoliation sheets The resin covering paper which carried out coating of the thermoplastics, such as paper bases, such as coat paper, art paper, paper of fine quality, and foaming paper, and polyethylene, to the paper base, The laminated paper which laminated thermoplastics, such as polyethylene, in the paper base, The film of thermoplastics, such as polyester (for example, PET), nylon, and polyolefine (for example, polypropylene), Or coincidence or the film of multilayer structure which carried out the laminating one by one is illustrated in the porosity film and the two or more layers film layer which have the opening which blended void initiators (a non-subtlety particle, organic particle, etc.) with thermoplastics, and carried out biaxial extension.

Furthermore, what stuck two or more sorts of said ingredient, and it not only uses the aforementioned ingredient alone, but was made into \*\*\*\*\* multilayer structure by well-known approaches, such as the dry laminate method, the wet laminating method, and the melting laminating method, can be used.

[0015] Moreover, in a paper base, although especially pulp does not have limitation, it can use the synthetic pulp which used non-wood pulp, such as wood pulp, such as chemical pulp of a needle-leaf tree or a broad-leaved tree, and mechanical pulp, recycled pulp, hemp, cotton, and a kenaf, polyethylene, polypropylene, etc. as the raw material, for example, and may use it combining these. Various kinds of fiber other than the above-mentioned pulp, such as inorganic fibers, such as organic fiber, such as an acrylic fiber, a rayon fiber, phenol fiber, a polyamide fiber, and polyester fiber, a glass fiber, a carbon fiber, and an alumina fiber, can be mixed. However, the conditions of a sheet which it is better to blend pulp 50% of the weight or more, and were excellent by this, and reinforcement can be obtained, considering the viewpoint of maintaining paper-making nature on practically possible level.

[0016] The separate section used for this invention consists of a base material for exfoliation sheets, and stratum disjunctum, and oriented films (a porosity film, a non-\*\*\*\* film, a monolayer film, double layer film, etc.), such as the poly lamination stencil paper which laminated polyethylene mold resin etc. in one side at least, polyolefine, and polyethylene terephthalate, are used for the filling processing paper which applied resin etc. to the stencil paper which uses cellulose pulp as a principal component as a base material for exfoliation sheets, and the stencil paper which uses cellulose pulp as a principal component.

[0017] although it combines suitably and can do as combination of the sheet base material of the acceptance sheet section, and the base material for exfoliation sheets -- for example, an acceptance sheet -- an inorganic pigment content polypropylene synthetic paper, an acceptance sheet, and the exfoliation sheet of non-\*\*\*\* PET, an acceptance sheet, and an exfoliation sheet are [ Porosity PET and an exfoliation sheet ] possible for various combination, such as Porosity PET, on Porosity PET and an exfoliation sheet to an inorganic pigment content polypropylene synthetic paper and an acceptance sheet.

[0018] an acceptance sheet is constituted in order to prevent generating of the transit trouble by static electricity, when an acceptance sheet runs in a printer -- it can be further alike at least and an antistatic agent can also be made to contain Moreover, the front face (on an acceptance layer) of the acceptance sheet section or a rear face (the layer which has an antistatic agent can be formed in the field which does not have the stratum disjunctum of the separator section.)

[0019] Resin with sufficient compatibility with the dyeing property color from an ink ribbon is preferably used for the image acceptance layer of this invention, and polyester resin, polycarbonate resin, a vinyl chloride copolymer, and a cellulosic are illustrated. It is desirable to add the cross linking agent, a slipping agent, a remover, etc. if needed in the case of a print, in order to prevent welding with the ink ribbon by heating of a thermal head. Moreover, fluorescent dye, a plasticizer, an antioxidant, a pigment, an ultraviolet ray absorbent, etc. may be added in an acceptance layer if needed. It mixes with the principal component of an acceptance layer, coating of these additives may be carried out, and coating may be carried out on an acceptance layer and/or to the bottom as another enveloping layer.

[0020] the acceptance layer of this invention -- coating machines, such as a bar coating machine, a gravure coating machine, a comma coating machine, a blade coating machine, and an air knife coater, -- using -- a conventional method -- following -- the coating liquid for acceptance stratification -- coating -- it can dry and form.

[0021]

[Example] Although the following example explains this invention to a detail, the range of this invention is not limited to these. In addition, in an example, unless it refuses especially, all of "%" and the "section" show "% of the weight" and the "weight section."

[0022] example 1 polyethylene terephthalate is used as a principal component, and it becomes solid content 8 g/m<sup>2</sup>

about the coating for the following color image acceptance stratification on the field of one of these, using a porosity film (the Toray Industries make, trademark: 50E63S) with a thickness of 50 micrometers as a base material for acceptance sheets -- as -- a die coating method -- coating -- it dried.

"The coating for color image acceptance stratification"

\*\* A part Weight section Polyester resin (trademark: made in [ Toyobo ] Byron 200) The 100 sections Silicone resin (trademark: KF393, product made from Shin-etsu silicon) The three sections Isocyanate (trademark: D-140 N bamboo NETO, Takeda Chemical make) The five sections Toluene The 300 sections [0023] subsequently, solid content coverage serves as an acceptance layer of the base material for acceptance sheets with 16 g/m<sup>2</sup> in the coating 1 for the following binder layers on an opposite side -- as -- the gravure coating method -- coating -- it dried and the binder layer was formed.

"The coating 1 for binder layers"

\*\* Part Weight section Acrylic binder (trademark: AT191, SAIDEN CHEMICAL INDUSTRY make) The 100 sections Epoxy curing agent (trademark: A-51, SAIDEN CHEMICAL INDUSTRY make) It diluted with the 2.25 sections, in addition ethyl acetate to 20%.

[0024] Use polyolefine as a principal component and a porosity film (trademark: 100E60, Toray Industries make) with a thickness of 100 micrometers is used as a base for exfoliation sheets. To the field of one of these, a silicon system remover (trademark: KS-830, Shin-Etsu Chemical make) so that it may become 0.6 g/m<sup>2</sup> by solid content the gravure coating method -- coating -- it dries, stratum disjunctum is formed and it becomes 1 g/m<sup>2</sup> by solid content about the coating for the following antistatic layers further in the opposite side of stratum disjunctum -- as -- a bar coating method -- coating -- it dried and the separate section was produced. The acceptance sheet was obtained by piling up and sticking the stratum disjunctum of this separate section, and the binder layer of a sheet-like base material.

[0025]

"The coating for antistatic layers"

\*\* A part Weight section The acrylic resin (trademark: Rikabond SAR-615A, product made from \*\*\*\*\*-izing) 100 section Epoxy curing agent (trademark: Rikabond SAR-615B, product made from \*\*\*\*\*-izing) The five sections Electric conduction agent (trademark: ST2000 H, the Mitsubishi oil formation) The 75 section Silica pigment (trademark-78A, product made from the Mizusawa chemistry) The 30 sections [0026] The acceptance sheet was obtained like the example 1 except having changed the coating 1 for binder layers of example 2 example 1 into the following coating 2 for binder layers.

"The coating 2 for binder layers"

\*\* Part Weight section Acrylic binder (trademark-E-115E, product made from Japanese carbide) The 100 sections Isocyanate curing agent (trademark: CK101, product made from Japanese carbide) It diluted with the one section, in addition ethyl acetate to 20%.

[0027] The acceptance sheet was obtained like the example 1 except having made the amount of coating of the coating 1 for binder layers of example of comparison 1 example 1 into 25 g/m<sup>2</sup>.

[0028] The acceptance sheet was obtained like the example 1 except having changed the coating 1 for binder layers of example of comparison 2 example 1 into the following coating 3 for binder layers.

"The coating 3 for binder layers"

\*\* Part Weight section Acrylic binder (trademark: AT191, SAIDEN CHEMICAL INDUSTRY make) The 100 sections Epoxy curing agent (trademark: A-51, SAIDEN CHEMICAL INDUSTRY make) It diluted with the 6.75 sections, in addition ethyl acetate to 20%.

[0029] The acceptance sheet was obtained like the example 1 except having changed the coating 1 for binder layers of example of comparison 3 example 1 into the following coating 4 for binder layers.

"The coating 4 for binder layers"

\*\* Part Weight section Acrylic binder (trademark-E-115E, product made from Japanese carbide) The 100 sections Epoxy curing agent (trademark: CK202, product made from Japanese carbide) It diluted with the one section, in addition ethyl acetate to 20%.

[0030] The measuring method of the evaluation approach "creep by 180-degree exfoliation force and shearing force" 180-degree exfoliation force is JIS. Z It is an approach according to 0237. The differences with JIS are the sticking-by-pressure approach and a test panel. In this invention, since the exfoliation force of an acceptance sheet layer and the separate section is measured, the sticking-by-pressure approach is sticking by pressure by the usual tuck machine, and a test panel becomes the separator section (exfoliation sheet section). The measuring method of the creep by shearing force calculated the creep ( drawing 2 ) when applying the load of F=60gf to the test piece of drawing 1 for 40 minutes by die-length mum.

[0031] It was left for five days in the environment of 20-degree-C60%RH after the print by the black solid pattern using the "after [ a print ] seal float" heat-of-sublimation imprint mold printer (trademark: DCP-648, Minolta make). The seal float in the half cutting section after neglect was evaluated.

O : -seal-float-less x : those with a seal float [0032] It is back at the time of a "sheet preservation curl" tuck. On both sides of the label sheet with curl of 7 (mm), it saved for one month at the glass plate in the environment of 20-degree-C60%RH. The curl after preservation was measured. Curl measured the float height (mm) of four top-most vertices when placing by turning upward the field which has curled the sheet on a horizontal table with the carpenter's square of the 1st class of JIS, and expressed it with the average of measured value. It was referred to as back, when the field which has curled was an acceptance stratification plane side and it was top and a rear face. Curl shelf life has the performance traverse and relation which are shown below. If the back curl at the time of a tuck is not held but it becomes flat curl, print curl becomes large at the top, trouble will be caused to performance traverse or the appearance as goods will also worsen.

[0033] The curl after a "print curl" print was measured. The curl notation approach is the same as that of the preceding clause.

[0034] The appearance of the sheet after a print appearance print was judged visually.

[0035] 50 sheets were printed by the black solid pattern using the performance-traverse heat-of-sublimation imprint mold printer (trademark: DCP-648, Minolta make), and performance traverse was evaluated to the two following steps.

O : poor performance traverse is nothing.

x: Those with poor transit.

[0036] An evaluation result is shown in Table 1.

[0037]

[Table 1]

	塗工量 g/m <sup>2</sup>	剥離力 mN/25mm	クリーブ μm	シール 浮き	保存 カール	印画 カール	印画後 外観	走行性
実施例 1	1 6	4 9 0	3 3	○	back 5	top 2 0	○	○
実施例 2	1 6	4 4 1	2 7	○	back 6	top 1 7	○	○
比較例 1	2 5	5 8 8	6 0	○	back 1	top 3 6	x	x
比較例 2	1 6	2 9 4	4	x	back 7	top 1 5	○	○
比較例 3	1 6	2 4 5	1 5	x	back 6	top 1 6	○	○

[0038]

[Effect of the Invention] The acceptance sheet of this invention does not have an after [ a print ] seal float, the curl at the time of a tuck can be saved, and performance traverse can offer a good label type sublimation acceptance sheet. The practical use value of the color hot printing acceptance sheet of this invention is high as an attachment tuck sheet.

[Translation done.]